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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,278	01/28/2004	Ki-hyun Kim	1793.1178	7587

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EXAMINER	
ALPHONSE, FRITZ	

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/765,278	KIM ET AL.	
	Examiner	Art Unit	
	Fritz Alphonse	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4, 13*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it is not clearly worded. Apparently, the abstract does not describe the novelty of the invention. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US Pub. No. 20030104788) in view of Tong (U.S. Pat. No. 3,728,678) and further in view of the published paper "Efficient Encoding of Low-Density parity-Check Codes" by Richardson et al (hereinafter "Richardson").

As to claim 12, Kim discloses an apparatus for generating parity information based on a parity check matrix H having p codewords of length c (see fig. 8), the apparatus including a parity check matrix generator reordering columns in the parity check matrix H, based on elements in each column having elements with a value of one to generate a reordered parity check matrix (paragraph [0065]).

Kim does not explicitly disclose a triangular matrix generator for determining a cross-point and calculators calculating values using the triangular matrix.

However, the limitation is obvious and well known in the art, as evidenced by Tong (col. 4, lines 51 through col. 5 line 29).

Therefore, it would have been obvious to a person of ordinary skill in the art, at the time of the invention to incorporate the teaching of Tong into the decoding device, as disclosed by Kim. Doing so would provide an efficient and economical apparatus for correcting both random and burst errors in a data transmission system (col. 2 lines 20-24).

In addition, as to claim 12, Kim does not disclose a calculator calculating values satisfying the equation Hx=0. However, the limitation is clearly disclosed by Richardson (see fig. 2, page 641).

Therefore, it would have been obvious to a person of ordinary skill in the art, at the time of the invention to improve upon the efficient low-density parity-check codes, as disclosed by Richardson. Using Richardson's method would help to exploit the sparseness of the parity-check matrix to obtain efficient encoders.

As to claim 13, Kim discloses an apparatus, wherein the parity check matrix generator comprises a calculator to find a top position of each element having a value of one for each column in the parity check matrix H (paragraph [0065]); and a column permutator to reorder columns from left to right in the order of the highest entry of an element having a value of one for each column (see fig. 8).

As to claim 14, Kim does not explicitly disclose a triangular matrix generator sequentially exchanges from left to right columns of a message matrix part. However, the limitation is clearly disclosed by Tong (col. 4, lines 51 through col. 5 line 29). See the motivation for the same reason disclosed in claim 12 above.

As to claims 15-16, 28-30, Kim does not explicitly disclose a calculator calculating values using a triangular matrix and, wherein the triangular matrix generator generates the parity data by a Gaussian elimination.

However, in the same field of endeavor, Kim (fig. 2) discloses an efficient encoding of low-density parity-check codes including a calculator calculating values using a triangular matrix and, wherein the triangular matrix generator generates the parity data by a Gaussian elimination (see fig. 2, page 641).

As to claims 2-5 and 9-11, method claims 2-5 and 9-11correspond to apparatus claims 15-16; therefore, they are analyzed as previously discussed in claims 15-16 above.

As to claim 17, the claim differs from claim 12 by the additional limitation "a column permutator to permutate rows and columns based on the positions of elements having a value of one in the rows to form an extended triangular matrix ". However, Tong (fig. 6) shows a triangular matrix including a column permutator to permutate rows and columns based on the positions of elements having a value of one in the rows to form an extended triangular matrix " (col. 10, lines 8-47). See the motivation for the same reason disclosed in claim 12 above.

As to claims 1 and 6 and 26, method claims 1, 6, 26 correspond to apparatus claims 12 and 17; therefore, they are analyzed as previously discussed in claims 12 and 17 above.

As to claims 19-20, Kim, Tong and Richardson disclose claim 17. Tong also discloses a calculator calculating values using the extended triangular matrix generates part of the parity data by a backward substitution calculation using the extended triangular matrix and the message words (col. 4, lines 51 through col. 5 line 29).

As to claims 22-25, method claims 22-25 correspond to apparatus claims 12 and 17; therefore, they are analyzed as previously discussed in claims 12 and 17 above.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks, Washington, D.C. 20231

or faxed to: (703) 872-9306 for all formal communications.

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Fourth Floor (Receptionist).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz Alphonse, whose telephone number is (571) 272-3813. The examiner can normally be reached on M-F, 8:30-6:00, Alt. Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert De Cady, can be reached at (571) 272-3819.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may also be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fritz Alphonse

Art Unit 2133

December 6, 2006

ALBERT DECADY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100